# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/431,996 | 11/02/1999 | KRISHNA BALACHANDRAN | BAL-7/LUC-11 | 9491 |

32205    7590    04/30/2003

PATTI & BRILL
ONE NORTH LASALLE STREET
44TH FLOOR
CHICAGO, IL 60602

| EXAMINER |
|---|
| AHN, SAM K |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2634 | |

DATE MAILED: 04/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

| | Application No. | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 09/431,996 | BALACHANDRAN ET AL. |
| | Examiner | Art Unit |
| | Sam K Ahn | 2634 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *amendment received on 3/11/03* .

2a)☒ This action is **FINAL.**      2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-44* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 8-11, 13-17, 19-22, 25, 26 and 30-41* is/are rejected.

7)☒ Claim(s) *6, 7, 12, 18, 23, 24, 27-29 and 42-44* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 March 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

   If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____ .

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

   a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1)☒ Notice of References Cited (PTO-892)          4)☐ Interview Summary (PTO-413) Paper No(s). _____ .
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)      5)☐ Notice of Informal Patent Application (PTO-152)
3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .      6)☐ Other: .

## DETAILED ACTION

### *Response to Arguments*

1.  The applicant's amended claims with independent claims including new features have

been fully considered, and rejection is as follows.

In regards to claims 1 and 13, Schramm teaches a wireless communication system

(21 of Fig.3) being capable of supporting link adaptation. Link adaptation is defined as

described by the applicant on page 3, lines 6-7 as the dynamic selection of modulation

and coding schemes based on radio link quality. Schramm discloses, in the abstract, a

communication system supporting multiple modulations and supporting the schemes

depending on the quality of connection. The system comprising a transmitter (20 of

Fig.3) for forming fixed length radio link control (RLC) blocks (Fig.2), for forming fixed

length coded sub-blocks (bursts in Fig.3) from the RLC blocks, and for configuring the

coded sub-blocks into transmission units being capable of supporting link adaptation at

multiple code rates. (note col.11 – col.12) However, Schramm does not explicitly teach

forming a downlink segment from the transmission units, for interleaving the downlink

segment into an interleaved downlink segment, and for transmitting the interleaved

downlink segment. Roobol teaches newly added features. Roobol teaches forming a

downlink segment from the transmission units (output of 70 in Fig.3 including LCH of

40a and 40b), interleaving the downlink segment into an interleaved downlink segment

(105) and transmitting the interleaved downlink segment (PDCH). (note col.3, line 51-

col.4, line 20) Therefore, it would have been obvious to one skilled in the art at the time

of invention to modify Schramm's teaching by including the steps above of Roobol, same

assignee, for the purpose of adding flexibility as different number of LCH (2 or 3) may

be combined into a downlink segment and enable efficient management of various

service mixes, as taught by Roobol. (note col.4, lines 20-38)

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.  Claims **1-4, 9-11, 13-17, 19-21** and **30-31** are rejected under 35 U.S.C. 103(a) as

being unpatentable over Schramm et al. ('663) in view of Roobol et al. ('058).

Regarding claims **1** and **13**, Schramm teaches a wireless communication system

(21 of Fig.3) being capable of supporting link adaptation. Link adaptation is defined as

described by the applicant on page 3, lines 6-7 as the dynamic selection of modulation

and coding schemes based on radio link quality. Schramm discloses, in the abstract, a

communication system supporting multiple modulations and supporting the schemes

depending on the quality of connection. The system comprising a transmitter (20 of

Fig.3) for forming fixed length radio link control (RLC) blocks (Fig.2), for forming fixed

length coded sub-blocks (bursts in Fig.3) from the RLC blocks, and for configuring the

coded sub-blocks into transmission units being capable of supporting link adaptation at

multiple code rates. (note col.11 – col.12)

However, Schramm does not explicitly teach forming a downlink segment from

the transmission units, for interleaving the downlink segment into an interleaved

downlink segment, and for transmitting the interleaved downlink segment. Roobol

teaches newly added features. Roobol teaches forming a downlink segment from the

transmission units (output of 70 in Fig.3 including LCH of 40a and 40b), interleaving the

downlink segment into an interleaved downlink segment (105) and transmitting the

interleaved downlink segment (PDCH). (note col.3, line 51- col.4, line 20) Therefore, it

would have been obvious to one skilled in the art at the time of invention to modify

Schramm's teaching by including the steps above of Roobol, same assignee, for the

purpose of adding flexibility as different number of LCH (2 or 3) may be combined into a

downlink segment and enable efficient management of various service mixes, as taught

by Roobol. (note col.4, lines 20-38)

Regarding claim **2**, Schramm in view of Roobol teaches all subject matter as applied

to claim 1. Schramm further teaches a receiver (a mobile station, 12 of Fig.3)

receiving the transmission units (sent by the base station). The receiver includes a

decoder for decoding the RLC blocks from the received transmission units as it is

transmitted in an encoded RLC blocks (note col.6, lines 60-67).

Regarding claims **3** and **9**, Schramm in view of Roobol teaches all subject matter as

applied to claim 1. Schramm further teaches retransmitting at least one of the RLC

blocks at a code rate which may be different from the code rate used for an initial

transmission of the at least one of the RLC blocks. (note col.11 – col.12)

Regarding claim **4**, Schramm teaches all subject matter as applied to claim 3. And further, all limitations are explained in regards to claims 3 and 9.

Regarding claim **10**, Schramm in view of Roobol teaches all subject matter as applied to claim 1. Schramm further teaches the transmitter adding block check sequence (BCS) (see RLC block in Fig. 4(a)) in order to check for errors in the information field. And further, by using the cyclic redundancy checking technique, the receiver evaluates the received RLC block. (col.3, lines 5-30)

Regarding claim **11**, Schramm in view of Roobol teaches all subject matter as applied to claim 1. Schramm further teaches an adaptive rate transmitter forming coded sub-blocks (or bursts) by dividing into at least two to, which is dividing by variable value of 2.

Regarding claim **14**, Schramm in view of Roobol teaches all subject matter as applied to claim 13. Schramm further teaches the step of configuring by adding cyclic redundancy check (CRC) sequences to the RLC blocks, as previously explained in regards to claim 10, and performing convolutional coding (note col. 2, lines 55 – col.3, lines 4) on the RLC blocks and the CRC sequences to generate encoded RLC blocks.

Regarding claim **15**, Schramm in view of Roobol teaches all subject matter as applied

to claim 14. Schramm further discloses the limitation of performing convolutional

coding with code rate of 1/3. (note col. 2, lines 55 – col.3, lines 4)


Regarding claim **16**, Schramm in view of Roobol teaches all subject matter as applied

to claim 14. Schramm also further discloses the limitation of step of interleaving the

encoded RLC blocks. (note col.3, lines 5-23)


Regarding claim **17**, Schramm in view of Roobol teaches all subject matter as applied

to claim 14. Schramm teaches and shows segmentation of encoded RLC blocks into

sub-blocks. Then, the groups of the coded sub-blocks (or bursts) are assembled to

form the transmission units. (see Fig.4(a))


Regarding claims **19** and **31**, Schramm in view of Roobol teaches all subject matter as

applied to claim 17. Schramm teaches transmission units sent over GSM bursts.

Schramm's teaching is also used in the general packet radio services system. (note

col.1, lines 20-37)


Regarding claims **20** and **21**, Schramm in view of Roobol teaches all subject matter as

applied to claim 17. Schramm discloses in Fig.4(a) and Fig.4(b) where there are 4

sub-blocks during the first transmission and 8 sub-blocks during the retransmission.

The modulation technique is different between the two, and the code rate as well is

implement differently. (note col.11 – col.12)

Regarding claim **30**, Schramm in view of Roobol teaches all subject matter as applied

to claim 17.   And further, Schramm teaches configuring step of forming at least two

of the transmission units of an unequal number of coded sub-blocks.  Fig.4(a) has 4

sub-blocks, while Fig.4(b) displays 8 sub-blocks transmitting in different code rate

## Claim Rejections - 35 USC § 103

3.   Claims **25-26** and **32-41** are rejected under 35 U.S.C. 103(a) as being unpatentable

over Schramm et al. (`663) in view of Roobol et al. (`058) in further view of

Trompower et al. (`124).

Regarding claims **25** and **32**, Schramm in view of Roobol teaches all features.

Schramm further teaches a wireless communication system (21 of Fig.3) being

capable of supporting link adaptation between multiple code rates and incremental

redundancy, as belonging to a well-known ARQ family. (col.6, lines 60-66)  As

previously explained above in regards to claims 1 and 13, Schramm discloses method

steps of forming fixed length RLC blocks (Fig.2).  Furthermore, combining the RLC

blocks with a cyclic redundancy check sequence for error detection to form error

coded RLC blocks is shown also in Fig.2 as BCS.  Block check sequence (BCS) is

used by the receiver to check for errors in the information field (note col.3, lines 16-

18).  The receiver implements cyclic redundancy check technique to evaluate the

received signal (note col.3, lines 25-27). Figure 2 further details processing the error

coded RLC blocks to form coded sub-blocks (or bursts), assembling groups of the

coded sub-blocks (or bursts) into transmission units based on the multiple code rates

(see Fig.4(a)). However, Schramm in view of Roobol does not teach forming of a

header indicative of the transmission units based on multiple code rates. Schramm

does disclose RLC blocks containing a BH (block header) portion, but does not

disclose the content. Trompower teaches implementation of a header in a frame

containing code rate information, (note col.16, lines 24-35, see 302 of Fig.3A). As

the transmitter may be able to send signal with different code rates, it would have

been obvious to one skilled in the art at the time of invention to include code rate data

in the header frame (BH of Fig.2 of Schramm) for the purpose of notifying the

receiver of the data rate transmitted and effectively receive the sent data.

Regarding claim **26**, Schramm in view of Roobol in further view of Trompower

teaches all subject matter as applied to claim 25. Schramm further discloses frame

with a header (BH) transmitted with the transmission units. (see Fig.4(a))

Regarding claim **33**, Schramm in view of Roobol in further view of Trompower

teaches all subject matter as applied to claim 32. Schramm further teaches

performing convolutional coding (note col. 2, lines 55 – col.3, lines 4) on the RLC

blocks to generate encoded RLC blocks.

Regarding claim **34**, Schramm in view of Roobol in further view of Trompower

teaches all subject matter as applied to claim 33. Schramm further discloses the

limitation of performing convolutional coding with code rate of 1/3. (note col. 2, lines

55 – col.3, lines 4)

Regarding claim **35**, Schramm in view of Roobol in further view of Trompower

teaches all subject matter as applied to claim 33. Schramm also further discloses the

limitation of step of interleaving the encoded RLC blocks. (note col.3, lines 5-23)

Regarding claim **36**, Schramm in view of Roobol in further view of Trompower

teaches all subject matter as applied to claim 35. Schramm teaches and shows

segmentation of encoded RLC blocks into sub-blocks. Then, the groups of the coded

sub-blocks (or bursts) are assembled to form the transmission units. (see Fig.4(a))

Regarding claim **37**, Schramm in view of Roobol in further view of Trompower

teaches all subject matter as applied to claim 36. Schramm teaches transmission units

sent over GSM bursts.(note col.1, lines 20-37)

Regarding claim **38**, Schramm in view of Roobol in further view of Trompower

teaches all subject matter as applied to claim 36. And further, Schramm teaches

configuring step of forming at least two of the transmission units of a different

number of coded sub-blocks. Fig.4(a) has 4 sub-blocks, while Fig.4(b) displays 8

sub-blocks transmitting in different code rate.

Regarding claim **39**, Schramm in view of Roobol in further view of Trompower

teaches all subject matter as applied to claim 38. Schramm further discloses

transmission of modulation using phase shift keying (PSK) as QPSK belongs to the

same family of PSK. (see Fig.4(b))

Regarding claim **40**, Schramm in view of Roobol in further view of Trompower

teaches all subject matter as applied to claim 38. Schramm further discloses

transmission of modulation using gaussian minimum shift keying (GMSK) as one of

common modulation type. (note col.1, lines 20-36)

Regarding claim **41**, Schramm in view of Roobol in further view of Trompower

teaches all subject matter as applied to claim 32. Schramm further teaches

retransmitting at least one of the RLC blocks at a code rate which may be different

from the code rate used for an initial transmission of the at least one of the RLC

blocks. (note col.11 – col.12)

4. Claims **5, 8** and **22** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Schramm et al. (`663) in view of Roobol et al. (`058).

Regarding claims **5, 8** and **22**, Schramm in view of Roobol teaches all subject matter

claimed, as applied to claim 2, 3 or 17. However, Schramm in view of Roobol does

not teach wherein the adaptive rate transmitter retransmits only a portion of a

transmission unit including the at least one RLC block. It would have been obvious

to one skilled in the art at the time of invention to implement transmission of only

portion of transmission units rather than retransmission of whole data for the purpose of better throughput. As unnecessary data are not retransmitted, transmitter may be available to transmit the next undelivered data rather than being tied up to resend already received data.

## *Allowable Subject Matter*

5. Claims **6-7, 12, 18, 23-24, 27-29,** and **42-44** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

## *Conclusion*

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited as having relevant subject matter in regards to radio link control.

   Turina et al. ('745)

   Khullar et al. ('928)

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

advisory action. In no event, however, will the statutory period for reply expire later than

SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Sam K Ahn whose telephone number is 703-305-0754.

The examiner can normally be reached on Mon-Fri 9am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone numbers for

the organization where this application or proceeding is assigned are 703-872-9314 for

regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is 703-305-

4700.

SKA
April 21, 2003

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600